

COKEMAKING STAKEHOLDER MEETING
Possible Revisions to 40 CFR Part 420
Iron and Steel Effluent Limitations Guidelines
WASHINGTON, D.C.
JULY 27, 1999

This document summarizes the Cokemaking Stakeholder Meeting sponsored by the Environmental Protection Agency (EPA or the Agency) at the Channel Inn in Washington, D.C. on July 27, 1999. The purpose of this meeting was to discuss possible regulatory incentives for alternative technologies and to solicit feedback from interested stakeholders. Attendees at the meeting included representatives from several cokemaking facilities, trade associations, environmental groups, EPA's Effluent Limitations Guidelines Task Force, EPA's Office of Water, EPA's Office of Air Quality Planning and Standards (OAQPS), EPA's Office of General Council, EPA's Office of Reinvention, and EPA's contractors for this project. A list of attendees is included in Attachment A. Presentation topics covered during the meeting included:

- Trends in furnace cokemaking;
- Preliminary assessment of energy requirements and environmental releases for four alternative steelmaking technologies;
- Environmental group perspective;
- Principal environmental issues facing the U.S. coke industry;
- By-product recovery cokemaking at integrated steel mills;
- Transition from by-product to heat-recovery cokemaking; and
- Non-recovery/heat-recovery systems.

A discussion period followed each presentation. In addition, EPA requested ideas from the stakeholders to identify useful incentives for greater pollution control. Although no formal record of the discussions was made, this document presents a brief synopsis of each presentation and a summary of EPA's meeting notes. Statements paraphrased in this document reflect the views of the individual presenters, and do not necessarily reflect the views of the Agency. Handouts, slides, and other materials from the presentations are available on the EPA Iron and Steel web site at <http://www.epa.gov/OST/ironsteel/>.

Following the welcome, Mr. George Jett of the U.S. EPA began the meeting with a presentation of aggregate statistics from industry survey results. The presentation slides are available on the EPA Iron and Steel web site.

Trends in Furnace Cokemaking

Mr. Gary Amendola of Amendola Engineering, Inc., a consultant to the EPA, discussed current and projected coke production and blast furnace productivity, alternative cokemaking technologies, and approximate investment costs for new or modified cokemaking facilities. Current literature indicates the following trends:

- U.S. hot metal production capacity is expected to be maintained at about 60 million tons per year for the foreseeable future.

- Hot metal production is expected to be maintained with fewer operating blast furnaces because of productivity improvements from increased use of pulverized coal injection, natural gas, oxygen, and metallics.
- Three cokemaking technologies that produce coke suitable for blast furnace operations, and that are demonstrated fully on a commercial scale, are conventional by-product coke plants, non-recovery or heat-recovery coke plants, and beehive coke plants (China).
- Approximate investment costs range from \$0 to \$10 million for a possible upgrade to meet revised Best Available Technology (BAT) for a by-product plant, and approximately \$350 million for a new heat-recovery coke plant.

The presentation slides are available on the EPA Iron and Steel web site.

After the presentation, an industry representative stated that although the total capital cost for a pad-up rebuild of a by-product battery is greater than the cost to build a new heat-recovery plant, the land requirement to build a heat-recovery plant is substantially larger (due to oven configuration and extended coking times in the heat-recovery process).

Preliminary Assessment of Energy Requirements and Environmental Releases for Four Alternative Steelmaking Technologies

Mr. Gary Amendola compared energy requirements for four alternative steelmaking technologies, incorporating processes that are currently available on a commercial scale. Steelmaking technologies evaluated included blast furnace/basic oxygen furnace (BOF) steelmaking with a by-product coke plant, blast furnace/BOF steelmaking with a heat-recovery coke plant; electric arc furnace (EAF) steelmaking with 100% scrap charge, and EAF steelmaking with 60% scrap/40% direct-reduced iron (DRI) charge. Net energy requirements to make 1.0 million tons of molten steel were:

- 1.99×10^{13} BTU for blast furnace/BOF steelmaking with a by-product coke plant;
- 2.09×10^{13} BTU for blast furnace/BOF steelmaking with a heat-recovery coke plant;
- 2.24×10^{13} BTU for EAF steelmaking with 100% scrap charge; and
- 2.82×10^{13} BTU for EAF steelmaking with 60% scrap/40% DRI charge.

Mr. Amendola also made a comparison of air emissions and effluent discharges from by-product and heat-recovery cokemaking. The presentation slides are available on the EPA Iron and Steel web site.

One stakeholder questioned how confident the Agency was that heat-recovery has a greater energy requirement. Mr. Amendola responded that coke oven gas is a better fuel than heat from a non-recovery battery.

Environmental Group Perspective

Ms. Jessica Landman of the Natural Resources Defense Council (NRDC) and Ms. Lois Epstein of the Environmental Defense Fund (EDF) raised several issues relevant to the Agency's revision of effluent guidelines for the Iron and Steel industry.

Ms. Landman, representing NRDC's views, gave an oral presentation recognizing that it is difficult for cokemaking facilities to consider building a new non-recovery system in lieu of end-of-pipe wastewater treatment modifications due to the large cost difference. However, NRDC believes that there are significant environmental benefits to non-recovery cokemaking and would like the Agency to provide incentives for industry to switch to this technology.

NRDC recommends more efficient data collection by EPA and encourages the Agency to perform a holistic, multimedia review of cokemaking operations. Currently, statutory deadlines for the various EPA offices (e.g., Office of Water, OAQPS) do not coincide to allow for multimedia rulemaking. To foster more innovative thinking in the regulatory process, NRDC recommends the Agency align regulatory and statutory deadlines, and take a sector based approach. Ms. Landman did not use presentation slides.

Ms. Epstein, representing EDF, encouraged the steel industry to be a leader in working towards environmental improvement via statutory and non-statutory means. EDF would like the Agency to provide incentives that will motivate the steel industry to employ more environmentally-friendly processes such as the Corex, HiSmelt, and CleanSmelt ironmaking processes, which all have lower energy requirements and emissions than conventional ironmaking processes.

EDF suggests four possible incentives to achieve this goal: (1) a voluntary credit for greenhouse gases (fact sheets describing this credit can be found on the EPA Iron and Steel web site); (2) modify upcoming Clean Air Act requirements to create a multimedia rule for the steel industry that makes good business sense; (3) use existing or potential incentive programs in the Department of Energy such as the Clean Coal Program at Geneva Steel; and (4) provide tax credits to companies that employ more environmentally-friendly processes. Ms. Epstein did not use presentation slides.

Principal Issues Facing the U.S. Coke Industry

Mr. David Ailor of the American Coke and Coal Chemicals Institute (ACCCI) presented materials from the May 1999 Meeting of the International Tar Association. He discussed the background, the key features, and the impacts on the U.S. cokemaking industry of the Clean Water Act (CWA), the Clean Air Act (CAA), and the Toxic Substances Control Act (TSCA). The presentation slides are available on the EPA Iron and Steel web site.

As a result of questions from the audience, Mr. Ailor explained the differences between the "maximum achievable control technology" (MACT) and the "lowest achievable emission rate" (LAER) standards, and how the residual risk standard is set. He also explained that as long as a battery is properly maintained, it can operate indefinitely. Therefore, he is unable to speculate about

any incentives which might encourage industry to spend the capital necessary to switch to non-recovery cokemaking.

By-Product Recovery Cokemaking at Integrated Steel Mills

In an introduction to the presentation, Mr. Jim Volanski of U.S. Steel Corporation stated that U.S. Steel made financial commitments to by-product recovery cokemaking decades ago, when by-products were in higher demand. The by-product cokemaking process is a demonstrated technology that can be cost effective and environmentally friendly. U.S. Steel's Clairton Works reports achieving consistent environmental compliance with the strict regulations in Allegheny County (Pennsylvania). U.S. Steel is committed to working with the Agency, but wants to ensure that no disincentives for by-product cokemaking are incorporated into the effluent guidelines revision. U.S. Steel also wants to prevent cokemaking from being diverted to another country that has less stringent environmental standards.

Mr. Mike Hohman and Ms. Donna Cericola, wastewater treatment operators at U.S. Steel Clairton Works, presented an overview of the wastewater treatment employed at their site and how the addition of dilution water serves a purpose. Called process control water, the water serves to control temperature, manage conductivity, and manage biodegradation kinetics. A comparison of single and two stage ammonia still operations concluded that a two stage operation is necessary for proper operation and to protect the environment. After the slide presentation, available on the EPA Iron and Steel web site, one industry representative recommended that the Agency determine the impact of wastewater evaporation during surface aeration on the quantity of process control water used in biological treatment systems.

Mr. Donald Perander of AK Steel Corporation gave an oral presentation providing an overview of AK Steel's Middletown, Ohio facility. This site discharges approximately 300,000 gallons of wastewater per day to a local Publicly Owned Treatment Works (POTW) that treats 12 to 13 million gallons daily. AK Steel has reviewed POTW effluent data and concluded that wastewater discharged from the Middletown site does not significantly impact the operation of the POTW. As a result, Mr. Perander suggests that a non-recovery cokemaking plant would not affect the POTW, and AK Steel recommends that the Agency not require biological treatment for cokemaking sites that discharge to POTWs.

Mr. Perander also spoke about the need for dilution water to ensure effective ammonia removal at the AK Steel Ashland, Kentucky coke plant. At the startup of the biological treatment system, the engineers determined that dilution water addition equivalent to 28% of the raw coke plant wastewater flow was necessary for nitrification. The treatment operators suggest that the cause of upsets when little or no dilution water is applied is likely a result from either high total dissolved solids (TDS) or the presence of an inhibitory compound, but the actual reason has not been identified. In February 1999, the treatment operators attempted to reduce the effluent flow rate to achieve compliance with mass limitations for phenol by reducing the dilution water flow rate. The results of the study indicated that a 50% reduction of dilution water caused thiocyanate, chemical oxygen demand (COD), and ammonia nitrogen concentrations to increase substantially. However, lesser reductions showed that a 30% reduction might be achievable.

Transition from By-product to Heat-recovery Cokemaking

Mr. Bob Johnston of ISPAT Inland, Inc. (formerly Inland Steel Corporation) gave an oral presentation explaining the Indiana Harbor Works' conversion from by-product to heat-recovery cokemaking. In the late 1980's and in anticipation of the Clean Air Act Amendments, Inland Steel Corporation began looking into non-recovery cokemaking. Research teams from Inland were sent to investigate the coal blends utilized at Jewell Coke Company's non-recovery plant in Vansant, Virginia. Inland found the technology to be promising and, in 1990, began to discuss the construction of a heat-recovery plant with Sun Coke Company and Raytheon engineers. The heat-recovery plant would differ from Jewell's non-recovery plant in that waste heat from the coke batteries would be utilized for power and steam generation. However, due to the concern that alternative energy tax credits would not be renewed and other business decisions made later that year, Inland decided not to pursue implementing the technology.

In 1991, Inland Steel Corporation decided to shut down all existing by-product coke batteries. This decision was made independently of the prospect of installing heat-recovery cokemaking, due to a potential \$350 million in upgrade costs for equipment replacement and Clean Air Act compliance. Consequently, outside suppliers of coke were found.

In 1996, after coke prices rose and alternative energy tax credits were extended, Inland Steel Corporation decided to enter into an agreement with Sun Coke Company, Raytheon, and a local power company to build a heat-recovery coke plant, which is now known as the Indiana Harbor Coke Company. The abundance of available land at Inland Steel's Indiana Harbor Works allowed the plant to be constructed without incurring substantial expenses associated with land acquisition or battery demolition. Mr. Jett suggested that transportation costs should be reduced by producing coke on site as opposed to having to purchase it. Additionally, Inland was also able to shut down a coal-fired steam and power generation plant, which resulted in a NO_x credit that was applied to the new construction.

Mr. Johnston added, in response to a question from an industry representative, that the quality of coke provide by the Indiana Harbor Coke Company heat-recovery plant has been outstanding according to ISPAT Inland ironmaking department personnel. Low variability in the coke has contributed to productivity gains at ISPAT Inland's blast furnace. Mr. Johnston did not use presentation slides.

Non-recovery/Heat-recovery Systems

Mr. Rick Waddell and Mr. Richard Westbrook of Sun Coke Company presented an overview of non-recovery and heat-recovery cokemaking technologies. Reference was made to the article "Heat-Recovery Cokemaking at Sun Coke" which is posted on the Association of Iron and Steel Engineers web page. One industry representative pointed out that the local power cost, SO₂ attainment, and NO_x emission credits are important considerations for siting a plant. For example, Inland had a coal fired steam/power plant that they shut down creating a NO_x credit. The presentation slides and a hypertext link to the article are available on the EPA Iron and Steel web site.

Mr. Walter Buss of Thyssen Still Otto presented the Pennsylvania Coke Technology, Inc. (PACTI) cokemaking process which looks similar to the negative pressure Jewell-Thompson oven, but has top coal charging. Mr. Buss pointed out that the U.S. is the only country with an emphasis on non-recovery cokemaking. Heat-recovery is not viable in Europe due to the energy situation. Reference was made to the article "Thyssen Still Otto/PACTI Non-recovery Cokemaking System" which is posted on the Association of Iron and Steel Engineers web page. A hypertext link to the article is available on the EPA Iron and Steel web site.

General Statements, Issues, and Concerns Made During the Open Discussion

- Mr. Ailor referenced a letter addressed to Mr. Michael Shapiro from the ACCCI regarding the new source MACT standard for coke ovens. The letter explains how by-product coke plants are the coal chemicals industry only source of crude coal tar. The new source MACT standard, which effectively precludes the construction of new by-product coke plants, "would reduce or eliminate domestic tar supplies available to the industry and potentially force the shutdown of some or all domestic tar refining plants." The ACCCI letter is available on the EPA Iron and Steel web site.
- Mr. Ailor also stated that if the Agency promulgates a regulatory standard that precludes the construction of new by-product coke plants, merchant coke plants would be more adversely impacted than coke plants owned by steel manufacturing companies.
- Ms. Landman stated that the effluent guidelines revision is not the best vehicle for providing meaningful incentives for companies with operable by-product coke plants to switch to non-recovery coke plants. She would like EPA to create a multimedia advisory committee since the Iron and Steel Common Sense Initiative Subcommittee is no longer active.
- Mr. Amendola suggested an incentive to allow alternative compliance dates for sites that commit to installing new technology.

Attachment A
Cokemaking Stakeholder Meeting Attendees
July 27, 1999

Name	Affiliation	Phone Number
Bill Anderson	U.S. EPA - EAD	(202) 260-5131
Elwood Forsht	U.S. EPA - EAD	(202) 260-7190
George Jett	U.S. EPA - EAD	(202) 260-7151
Kevin Tingley	U.S. EPA - EAD	(202) 260-9843
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David C. Ailor	American Coke and Coal Chemicals Institute	(202) 452-1140
Barbara Bachman	Bethlehem Steel	(610) 694-2897
A. Bhattacharyya	ABS Enterprise, Inc., Rep. - U.S. Steel, Clairton Works	(703) 690-3925
George Bradley	Indiana Harbor Coke	(219) 397-2180
Walter Buss	Thyssen Still Otto	(412) 269-5858
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Donna Cericola	U.S. Steel, Clairton Works	(412) 233-1769
Lois Epstein	Environmental Defense Fund	(202) 387-3500
Bobby Fisher	Sloss Industries	(205) 808-7874
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Jack Heintz	National Steel Corporation	(219) 273-7343
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Bob Johnston	ISPAT Inland, Inc.	(219) 399-4194

Name	Affiliation	Phone Number
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Don Perander	AK Steel	(513) 425-5329
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Bruce Steiner	American Iron and Steel Institute	(202) 452-7112
Jim Volanski	U.S. Steel	(412) 433-5904
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Richard Westbrook	Sun Coke Company	(423) 558-3251
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